

"Across northern Idaho, Montana, and the Dakotas service virtually was suspended. Like unsatisfactory conditions prevailed on all the northern transcontinental lines.

"For several hours during the early morning cable communication *via* the Newfoundland cables of the Western Union was all but paralysed."

During the progress of the aurora, Mr. Frank Sullivan and Mr. E. P. Hubble, of this observatory, tried the wireless receiver here, with which time-signals are received from Arlington, Virginia, Mr. Sullivan at 14h. 45m., when the arch was strong but not active, and Mr. Hubble at 20h. om., when the greatest display occurred. They found in both cases that the static conditions were normal. Mr. Sullivan reports that it was unusually quiet. E. E. BARNARD.

Yerkes Observatory, Williams Bay,
Wisconsin, June 25.

The Magnetic Storm and Solar Disturbance of June 17, 1915.

A CORRECTION is necessary for the value of r' of arc displacement for the H.F., given in my letter published in NATURE of June 24. It should read, line 18 ($r' = 4.0 \times 10^{-5}$ C.G.S. units). There is also an ambiguity in the preceding line, in the use of the word displacement. The extreme values of the greatest oscillation in the H.F. about 4.15 p.m. amounted to 100', as stated, but the maximum displacement was 76', the value of the base line being 24'.

In his very interesting letter on this subject (NATURE, July 1), Dr. Chree mentions several dates on which sudden movements of the magnets occurred, which are presumably of cosmic origin. It may also be of interest to compare the state of the solar surface on these dates with these sudden movements. The first occurred at 1 p.m. on June 16. On this date the two sympathetic groups of spots, which I have associated with the magnetic storm of June 17, evinced considerable disturbance, the faculae in the neighbourhood of these two groups, as also bright faculae conjoined with two other groups nearer the E. limb, showing a decided drift towards the south. On June 18, as already described in my last letter, the whole of the region between these two groups was violently disturbed, and the faculae, which must have been very bright to be visible in the middle regions of the sun, showed the same southerly drift. As this was visually the most disturbed region of the sun, and, moreover, it was near the heliographic position of the earth, it seemed most likely that this region was the one connected with the magnetic storm, if any such direct connection exists.

On June 14 a bright compact patch of faculae appeared in the N.E. quadrant on the sun's limb, in which were a few small dots. This new disturbance continued to grow, until on June 21 it had developed into a fine group of large spots near the central meridian. Its mean approximate position was $+17^\circ$ latitude, and 356° longitude. This region was also much disturbed on June 19. Dr. Chree directs attention to the considerable magnetic disturbance which commenced at 3.10 p.m. on June 21 with a sudden movement of the H.F. magnet. Dr. Chree also mentions another sudden commencement on June 7 "of considerable size at a time when Father Cortie tells us the sun was almost free from spots." On that date there was only one group of very small spots at mean latitude $+21^\circ$ and longitude 198° , in a ring of faculae. But I find on consulting our solar drawings that

M. Henroteau, the observer, has made the following note on the drawing of June 8, with regard to this group of very small spots: "The region of the spots seems very disturbed."

Finally, that quiet magnetic conditions show the twenty-seven day period is not inconsistent with, but would naturally follow from, successive synodic pre-
sessment earthwards of an undisturbed hemisphere of the sun. A. L. CORTIE.

Stonyhurst College Observatory, July 4.

Use of Tyrosine in Promoting Organic Growth.

I DESIRE to direct the attention of readers of NATURE to the influence of tyrosine in promoting the growth and multiplication of any organisms that may be found in tubes five to ten months after they have been hermetically sealed and sterilised, as described in "The Origin of Life," second edition, 1913, and NATURE of January 22, 1914.

The June number of the Proceedings of the Royal Society of Medicine contains an illustrated communication dealing with the effects of this powerful auxetic when used in the form of a 0.05 per cent. solution. Its influence was tested on a large number of tubes ripe for examination, containing five different kinds of experimental solutions (the constitution of which is given) by adding, with all necessary precautions, about twenty drops of the tyrosine solution to each tube when it was opened. The tubes were then re-closed and replaced in the incubator for three to four weeks. When the contents of these tubes were re-examined after such an interval a very considerable growth and multiplication of unmistakable organisms were found to have taken place, thus tending to disprove the two principal doubts that had been urged against the original experiments by showing (1) that what were found were not mere pseudo-organisms; or (2) organisms which had pre-existed in the solutions, and had been killed by the sterilising process. Photomicrographs of the organisms taken from the tubes before, as well as after, the addition of the tyrosine show its great influence in favouring the multiplication of bacteria, torulae, and moulds.

I have quite lately heard from the brothers Mary (Institut de Biophysique, Paris) that they have been similarly successful in obtaining from some of their tubes, after the addition of tyrosine, plenty of budding torulae, as well as delicate spore-bearing moulds, and that they are about to publish an account of their investigation.

The last number of the Proceedings of the Royal Society (B. 609) contains an interesting paper by Prof. Benjamin Moore and W. G. Evans, in which they describe and figure some simple pseudo-organisms, of a kind with which I am quite familiar, obtained from a limited number of tubes containing solutions apparently similar to some of those which I have used. I have prepared and examined more than a thousand of these tubes, and among them have found many barren series. A comparison of their illustrations with mine will show that they have hitherto met with totally different objects. It is true, however, that some of their finds, under the low magnification which they employ, have a superficial resemblance to matted or twisted hyphae of moulds (see especially Figs. 1, 7, and 11).

The simplest solution from which I have obtained different kinds of moulds, and which I can recommend to others, is one made from 10 per cent. solutions of iron sulphate and potassium ferrocyanide, in which one drop of the former and two of the latter are added to each 30 c.c. of distilled water. The iron stock

solution changes colour somewhat after a time, owing to oxidation of the ferrous salt, as Sir Wm. Ramsay tells me, and the moulds found in solutions prepared from fresh stock fluids and from others one or two months old have been of a different kind. The remarkable mould of *Cladosporium* type referred to in a note to my paper was found in each of a series of tubes the solutions of which had been prepared from stock fluids one month old. An examination of the stock fluids themselves, even after three months, does not reveal moulds of any kind.

H. CHARLTON BASTIAN.

Fairfield, Chesham Bois, Bucks, July 9.

Napoleon and the University of Pavia.

THE following allusion to Napoleon having spared the University of Pavia in 1804 on account of the memory of the illustrious man of science, Spallanzani, who had been a professor there, is so interesting at the present time that I venture to bring it under the notice of readers of NATURE.

The passage is from Baron's "Life of Dr. Edward Jenner" (vol. ii., p. 35), which was published in 1838:—"He who flushed with victory and at the head of the revolutionary army of France had spared the University of Pavia out of respect to the genius of Spallanzani when the city itself was given up to plunder, proved that the claims of science were not forgotten amid the astonishing events which carried him forward to the highest pinnacle of ambition. His animosity to England had been shown in that vehement and decided manner which marked all his actions; yet there was one chord of sympathy unbroken which, when duly touched, showed that his intoxicating success had not raised his proud spirit beyond some of the calls of justice and humanity, and that he could still be moved by the peaceful arguments of truth and science."

Napoleon's conduct in regard to the ancient University of Pavia is in striking contrast to that of the Kaiser in regard to the University of Louvain. The Germans, in their own opinion, are pre-eminent in the subject of the history of medicine, and yet it has been reserved for Germans to destroy the University of van Helmont, the father of chemistry, of Vesalius, the father of anatomy, of Schwann, the originator of the cell-theory. Further comment seems unnecessary.

D. FRASER HARRIS.

Dalhousie University, Halifax, N.S., June 19,

A New Tsetse-Fly from Zululand.

THE Durban Museum has lately received from Mr. R. A. L. Brandon, the magistrate of Ubombo, Zululand, a tsetse-fly captured by him in the court-house at Ubombo, towards the end of March, which is very distinct from the ordinary Zululand species, *Glossina pallidipes*, Austen, and apparently belongs to an hitherto unknown form.

It is a member of the *palpalis* group, and seems most nearly related to *G. tachnoides*, Westw., but the markings on the abdomen are not so strong or so sharply defined, and the dorsum of the thorax is buff. It is a female, and measures 8 mm. in length, exclusive of proboscis. In honour of the captor it may be known as *Glossina brandoni*.

It is my intention to give a detailed description in the next number of the "Annals of the Durban Museum."

E. C. CHUBB.
(Curator).

Durban Museum, Natal, June 16.

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MUNITION METALS.

IN this article an attempt is made to compare briefly the resources of the Allies and the enemy countries in respect of metals which are regarded as essential for War purposes.

First in order of importance comes iron, the basis of the modern gun, armour-plate, armour-piercing projectile, shrapnel shell, high-explosive shell, and all the varieties of steel which find application in one way or another. Both sides have a sufficiency of iron ore and the accessories required for smelting, although the deposits in the enemy countries are inferior in quality to those possessed by the Allies. An illustration of this is furnished by a comparison of the amounts of acid and basic steel produced in Germany and Great Britain in 1913—the last year for which the complete figures are available. Germany's total steel production for that year was just under 19,000,000 tons, of which 96 per cent. was made in basic-lined furnaces; Great Britain's output was 7,663,000 tons, of which only 36 per cent. was made by the basic process. Both countries, however, imported considerable quantities of Swedish pig-iron, which is used for the manufacture of steels of the highest class, e.g., tool steels, and Great Britain also imported substantial amounts of Spanish hematite ore, which was smelted with the clay ironstone ores of the Cleveland district, which are low in iron, and contain, for the most part, more phosphorus than is compatible with the transformation of the resulting pig-iron into steel by any acid process.

The production of open-hearth steel from pig-iron—and such steel provides the casing of the high-explosive shell and the shrapnel shell—demands, however, a second and very important metal, namely, manganese, which in the form of ferro-manganese or silico-spiegel is used not only to de-oxidise the fluid steel, but to leave from 0.5 to 1.0 per cent. manganese in the finished product. The chief producers of marketable manganese ore in order of importance are Russia, India, and the United States of America; which in 1913 furnished about 93 per cent. of the total quantity mined. The raw material is pyrolusite, a "straight" manganese ore corresponding when pure to MnO_2 . The main supplies of pure ores, therefore, are in the Allied or neutral countries. In 1913 Germany imported about 670,000 tons, chiefly from Russia. The figures of her domestic production in 1913 are not available, but in 1912 her output was 90,980 tons, while that of Austria-Hungary was 16,540 tons in 1913.

In spite of these figures there is no sufficient reason for concluding that the enemy countries will be greatly hampered even if all external sources of supply are shut off, as they probably are. Confining our attention to Germany, the predominant partner, it must be pointed out in the first place that 4,300,000 tons of her steel production in 1913 were exported, and that except in so far as Austria-Hungary and Turkey are concerned this excess would be available for her own